(ii) picking up the light scattered by the reaction medium and transmitting it to a Raman spectrometer,

(iii) determining the Raman spectrum, which shows the energy of the scattered light as a function of the difference in wavelength with respect to the incident light radiation,

(iv)

a) by either the intensities (areas or heights) of specific lines of the spectrum:

- of un(co)polymerized free monomer(s) in the reaction medium,
- and of the polymer obtained,

b) or the concentrations of un(co)polymerized free monomer(s) in the reaction medium and of the polymer obtained are calculated from the Raman spectrum using quantitative spectral analytical methods;

(v) calculating the process data either from the concentrations of free monomer(s) and of the polymer obtained or from the intensities (areas or heights) of specific lines of the spectrum of free monomer(s) in the reaction medium and from the intensities (areas or heights) of specific lines of the spectrum of the polymer obtained;

(vi) comparing these process data with reference data specific to the process for the production of the latex with the predefined properties;

(vii) and adjusting the reaction parameters, comprising the pressure, the stirring of the medium and the feeding with monomers, in order to minimize the difference between the process data measured in-line and the reference process data.

2. (Amended) The process as claimed in claim 1, wherein the Raman spectrometer is a Fourier transform or optical dispersive Raman spectrometer.

3. (Amended) The process as claimed in claim 2, wherein the latex results from the emulsion (co)polymerization of ethylenically unsaturated monomers selected from the group consisting:

- of styrene and/or its derivatives;
- of dienes;
- of (meth)acrylic esters comprising esters of acrylic acid and of methacrylic acid with hydrogenated or fluorinated C_1-C_{12};
- of vinyl nitrites having from 3 to 12 carbon atoms;
- of carboxylic acid vinyl esters;
- of vinyl halides;
- and their mixture.

A' cont

4. (Amended) The process as claimed in claim 3, wherein the emulsion additionally comprises other ethylenically unsaturated monomers, (co)polymerizable with the monomers of the preceding claim, selected from the group consisting of:

- unsaturated ethylenic mono- and dicarboxylic acids;
- monoalkyl esters of the abovementioned dicarboxylic acids with alkanols and their N-substituted derivatives;
- amides of unsaturated carboxylic acids;

- ethylenic monomers comprising a sulfonic acid group and its alkali metal or ammonium salts;

- unsaturated ethylenic monomers comprising a secondary, tertiary or quaternary amino group or a heterocyclic group comprising nitrogen;

- zwitterionic monomers;

- and their mixture.

A' CONT

5. (Amended) The process as claimed in claim 4, wherein the direct in-line monitoring is carried out continuously for the preparation of styrene/butadiene latex by the aqueous emulsion (co)polymerization of styrene with butadiene.

6. (Amended) The process as claimed in claim 1, wherein the direct in-line monitoring is carried out for the preparation of a latex by emulsion (co)polymerization in which the continuous phase is composed of water.

7. (Amended) The process as claimed in claim 1, wherein the intensity (area or height) of the specific lines of the Raman scattering spectrum is calculated:

- on the one hand, at approximately 1 635 $\pm$ 100 cm^{-1}, a line associated with the stretching vibration of the carbon-carbon double bond of the free monomers which have not yet (co)polymerized,

- and, on the other hand, at approximately 1 660 $\pm$ 100 cm^{-1}, a line associated with the stretching vibrations of the carbon-carbon double bonds incorporated in the main

chain of the polymer obtained when the monomer mixture comprises at least one diene compound.

8. (Amended) The process as claimed in claim 1, wherein the direct in-line monitoring is carried out by calculating the concentrations of free monomer(s) and of the polymer obtained by multivariable chemometric analytical methods, this calculation being made by a computer having in memory equations establishing a correlation between the Raman spectra and the concentrations of free monomer(s) and of the polymer obtained and the measured Raman spectra being introduced into said memory in order to calculate the concentrations of free monomer(s) and of the polymer obtained during the polymerization.

A' CONT 9. (Amended) A latex-based composition capable of being obtained by the emulsion (co)polymerization process as claimed in claim 1.

10. (Amended) A device for the direct in-line monitoring *in situ* of the process for the preparation of a latex with predefined properties by emulsion (co)polymerization of ethylenically unsaturated monomers as claimed in claim 1, comprising:

(i) a reactor comprising at least one means for feeding with monomers, with surfactants, with (co)polymerization initiator and with water;

(ii) at least one optical probe which makes it possible to analyze the contents of the reactor;

(iii) a Raman spectrometer;

(iv) at least one optical fiber

- via which fiber incident light radiation with a wavelength of between 200 nm and 1 400 nm, is conveyed from the Raman spectrometer to the optical probe,
- and via which fiber the light scattered by the reaction medium is reconveyed to the spectrometer providing the Raman spectrum, the optical fiber being identical or different for the conveying and the reconveying;

(v) a calculator, coupled to the spectrometer, making it possible to calculate, from the Raman spectrum:

a) either the intensities (areas or heights) of specific lines of the spectrum

- of un(co)polymerized free monomer(s) in the reaction medium
- and of the polymer obtained,

b) or the concentrations of un(co)polymerized free monomer(s) in the reaction medium and of the polymer obtained, from the Raman spectrum using quantitative spectral analytical methods;

(vi) and an adjusting automaton in which is programmed at least one mathematical algorithm making it possible to adjust the reaction parameters comprising the temperature, the pressure, the rate of stirring of the medium and the feeding with monomers, in order to minimize the difference between the process data measured in-line and the reference process data; the process data being based on an algebraic transformation either of the line intensities or of the concentrations of free monomer(s) and of the polymer obtained, and the reference data), based on this same algebraic transformation, being specific data of the process for the production of the latex with predefined properties.

11. (Amended) The device as claimed in claim 1, wherein the adjusting automaton is a programable device comprising at least one mathematical algorithm, said device being in contact with the calculator coupled to the Raman spectrometer, makes it possible to act continuously on the parameters of the process to reproduce a predetermined instantaneous conversion profile.

12. (Amended) The device as claimed in claim 10, wherein the Raman spectrometer is a Fourier transform Raman spectrometer and comprises a light radiation source, an interferometric optical system, a detector, an electronic system and a computing system.

A' cont

13. (Amended) The device as claimed in claim 10, wherein the optical probe is directly positioned close to the reactor in which the (co)polymerization takes place, without distinction

- either in contact with the reaction medium,
- or placed behind a window, so that there is no physical contact between said probe and the reaction medium.

14. (Amended) The device as claimed in claim 10, wherein the probe comprises one or more means intended to weaken and/or to remove the interfering spectrum or spectra.